KARTVELISHVILI, N. A.

32398. Kartvelishvili, N. A. K voprosu o raschete techeniy estestvennykh potokov. Izvestiya Gruz. nauch.-issled. in-ta gidrotekhniki i melioratsii, t. I, 1949, s. 29-42. ----- Rezyume na gruz. yaz.

SO: Letopis' Zhurnal'nykh Statey, Vol. 44

KARTVELISHVILI, N. A.

"A Case of Unstable Operation in a Derivation System"
Gidrotekh. Stroi., No 3, 1949

KARTVELISHVILI, N. A. Propellers, Fans, Turbines, Pumps etc. [illegible]

2706. Kartvelishvili, N. A., On temporary irregular running of hydraulic turbines, in particular, high-speed turbines (in Russian). [illegible] SSSR [illegible] 75, 5, 625-628 [illegible]

[illegible]

$\Delta\varphi(t)$ during the regulation process (time t) is approximately determined under three simplifying assumptions: (1) After the sudden change, the turbine load remains unchanged. Hence the moment of the electric load is considered as a known function of the frequency (in the general case, in addition, a certain relation between load and time has to be considered). (2) The torque of the turbine depends on the pressure existing in the volute casing before the guide vanes, and on the square of the revolutions and frequency, respectively. (3) The sudden load change causes a water hammer in the volute casing, whose intensity along the volute casing may vary.

For the dependence under (2), the average value of the changed pressure, caused by the water hammer, is assumed. The difference between the turbine torque and the moment of the electric resistance is proportional to the rpm change and frequency change ($d\Delta\varphi/dt$), respectively. From there, considering the assumptions (1) to (3), a differential equation is established which, neglecting the higher powers of the unknown $\Delta\varphi(t)$, can be reduced to a linear differential equation.

M. Strscheletzky, Germany

KARTVELISHVILI, N A

N/5
663.21
.kl

Neustanovivshiyesya rezhimy v silovykh uzlakh gidroelektricheskikh stantsiy (Non-steady states in power centers of hydro electrical stations) Moskva, Gosenergoizdat, 1951.

135 p. diagrs., tables

KARTVELISHVILI, N.A., dotsent, kand. tekhn. nauk

Periodic pressure oscillations in the penstock of hydroelectric power stations. Izv. VNIIG 46:152-166 '51.

(MIRA 12:5)

(Hydroelectric power stations)

KARTVELISHVILI, N.A.

Water hammer and vibrations of liquids in pressure installations of hydroelectric stations. Izv.AN Arm.SSR.Ser.FMET nauk 5 no.3: 31-45 '52. (MLRA 9:8)
(Hydroelectric power stations) (Water hammer)

KARTVELISHVILI, N.A., doktor tekhn.nauk

Development of theory of unsteady conditions in hydroelectric power stations. Izv.VNIIG 48:19-29 '52. (MIRA 12:5)
(Hydraulics)

KARTVELISHVILI, N.A., prof., doktor tekhn.nauk

Lateral vibrations and dynamic strength of penstocks in connection with cavitation phenomena in turbines. Izv.VNIIG 49:31-53 '53. (MIRA 12:5)

(Penstocks--Vibration)

KARTVELISHVILI, N.A., prof., doktor tekhn.nauk

Hydraulic design of pneumatic surge tanks. Izv.VNIIG 50: 137-156 '53. (MIRA 12:5)
(Hydraulic engineering)

KARTVELISHVILI, N.A. (Moscow)

Stability in general in stationary regime of water-power plants with equalizing reservoirs. Inzh.sbor. 20:25-30 '54. (MIRA 8:7)

(Hydroelectric power stations) (Reservoirs)

KARTVELISHVILI, N.A., prof., doktor tekhn.nauk

Letter to the editors. Izv.VNIIG 51:230 '54. (MIRA 12:5)
(Hydraulic engineering)

KARTVELISHVILI, N.A. (Moskva)

Wave formation on rapids. Izv. AN SSSR Otd. tekh. nauk no.1: 45-56 Ja '55. (MLRA 8:8)

(Waves)

SOV/124-57-5-5571

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 5, p 66 (USSR)

AUTHOR: Kartvelishvili, N. A.

TITLE: Blade Shocks in Hydraulic Turbines and Axisymmetrical Vibrations of Penstocks (Lopatochnyye udary v gidravlicheskikh turbinakh i osesimmetrichnyye vibratsii napornykh truboprovodov)

PERIODICAL: Izv. Vses. n.-i. in-ta gidrotekhn., 1955, Vol 54, pp 162-172

ABSTRACT: The problem of blade shock in slow and standard mixed (radial-axial-type) turbines, causing vibrations in the turbines and the penstock, is examined. It is demonstrated that blade-shock resonance can manifest itself only as a sharp rise in the amplitude of axisymmetrical vibrations in the penstock. An approximated evaluation (not at all approximating resonance) is offered with regard to the relative variation in the amplitude of pressure oscillations due to blade shock when the number of turbine guide vanes and rotor blades is changed. A determination is made of the natural frequencies of axisymmetrical vibrations in conduits. A numerical sample calculation is offered.

G. V. Aronovich

Card 1/1

Kartvelishvili, N. A.

1460. Kartvelishvili, N. A., Mathematical representation and calculation methods in river flow regulation (in Russian), *Izv. Akad. Nauk SSSR, Otd. Tekh. Nauk* no. 1, 126-136, Jan. 1956.

Author compares statistical and genetic methods and their significance in hydrology. Statistical method alone can be applied for a basin at stationary conditions; it will fail when runoff is essentially changed by reservoirs. Author opposes usual selection of few typical years for detailed investigation. Instead, he suggests construction of an idealized hydrograph, where discharge of desired probability is computed for every day through a year. Integration is performed for solution of any problem connected with runoff regulation within limits of an assigned probability.

S. Kolupaila, USA

SOV/124-57-7-7897

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 62 (USSR)

AUTHOR: Kartvelishvili, N. A.

TITLE: The Application of Mathematical Analysis Methods to Water-power Engineering Problems (Primeneniye metodov matematicheskogo analiza v gidroenergetike)

PERIODICAL: Tr. Mosk. energ. in-ta, 1956, Nr 19, pp 18-27

ABSTRACT: The author expresses a number of critical remarks concerning the existing methods of water-flow control and declares that modern theory has the choice of two methods of design calculation: The method of calendar series and the method of generalized statistical characteristics, both of which assume the process of flow as stationary. The author assumes that the theory of the flow-control process can be established along the lines of the modern theory of stochastic processes, assuming that the higher distribution functions of the stochastic variable are basic functions. The article adduces considerations on the application of this method to a practical case of water-flow control according to a guaranteed energy-output chart and derives an expression for ensuring fulfillment of the requirements of a planned load

Card 1/2

SOV/124-57-7-7897

The Application of Mathematical Analysis Methods to Water-power Engineering (cont.)

program. Another problem is to establish a theory of day-by-day control of a hydroelectric powerplant taking into consideration the nonstationary regime of the tail-water basin of the installation. The author gives a group of equations determining this phenomenon and expresses considerations concerning the methods of solution.

S. Ya. Vartazarov

Card 2/2

SOV/124-57-7-7868

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 57 (USSR)

AUTHORS: Ayvaz'yan, V. G., Kartvelishvili, N. A., Kuperman, V. L.

TITLE: Surge Tank of the Pneumatic Type (Uravnitel'nyy rezervuar pnevmaticheskogo tipa)

PERIODICAL: Tr. Mosk. energ. in-ta, 1956, Nr 19, pp 160-173

ABSTRACT: The problem of incorporating a pneumatic surge tank into the system of a hydro-electric powerplant with a subterranean powerhouse is investigated. It is pointed out that the use of a pneumatic surge tank in a specific case taken under advisement permits doing away with an above-the-ground location of the tank. It is further pointed out that such a pneumatic surge tank does not create any additional problems that could affect adversely the operation of the hydraulic power-generating units and permits retaining a controllability of the entire system analogous to that of a system equipped with a regular surge tank. The desirability of conducting an investigation on a model of a pneumatic surge tank is mentioned.

G. V. Aronovich

Card 1/1

Kafedra gidrotekhnicheskikh sooruzheniy i kafedra gidroenergetiki

PA - 2190

AUTHOR: KARTVELISHVILI, N.A.

TITLE: The Stability of the Steady Mode of Operation of a Hydro-Electric Station with a Combined Lead-Off and Drainage Canal. (Ustoychivost' statsionarnykh rezhimov gidroelektrostantsii s kombinirovannoy derivatsiyey i otvadyashchim kanalom, Russian)

PERIODICAL: Izvestiia Akad.Nauk SSSR, Otdel.Tekhn. 1957, Vol , Nr1, pp 44-47 (U.S.S.R.)
Received: 3 / 1957 Reviewed: 4 / 1957

ABSTRACT: The investigation deals with the steady mode of operation of a hydro-electric station with a pressure let-off (which is preceded by an open canal) and a drainage tube. The influences of the development of waves in the canal and in the drainage tube on stability are considered. The case of the power station working at full load is investigated. The equations of a not yet steady motion in the open prismatic canal with small variations of the uniform steady mode of operation are set up. As the investigation of stability is concerned only with what is taking place at the entrance of the drainage tunnel and at the end of the drainage tubes of the turbines these solutions are correspondingly modified and the equations for a non-steady operation in pressure plants of a hydro-electric station are set up. First comes the dynamic equation for the drainage tunnel, then follows the equation for untearability, and finally the equation for the

Card 1/2

PA - 2190

The Stability of the Steady Mode of Operation of a Hydro-Electric Station with a Combined Lead-Off and Drainage Canal.

control of turbines. Here only the problem of the stability of the steady working methods in the case of perfect control and in a pipe line without inertia is investigated. From the formulae obtained it can be seen that the wave course in the drainage tube deteriorates the stability of the system, the wave course in the canal, however, improves the conditions in one of the formulae obtained while it deteriorates those in the other. Neglecting the influence of the wave course in the drainage tube both formulae go over into those obtained with much more difficulties by GERBER. (1 illustration).

ASSOCIATION: NOT GIVEN
PRESENTED BY:
SUBMITTED: 28.7.1956
AVAILABLE: Library of Congress

Card 2/2

KARTVELISHVILI, N.A.

AUTHOR: Kartvelishvili, N. A. (Moscow). 24-6-15/24

TITLE: Regulation over many years of the river flow from the point of view of satisfying power requirements in certain complicated cases. (Energeticheskoye mnogoletneye regulirovaniye rechnogo stoka v nekotorykh slozhnykh sluchayakh).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.6, pp.102-109 (U.S.S.R.)

ABSTRACT: In an earlier paper (2) the author has shown that the river flow represents a continuous stochastic process. The problem of regulation of the river flow to satisfy power requirements can be solved fully and accurately on this basis provided certain difficulties are overcome. If the investigation is restricted to the fluctuations of the flow rates during sufficiently long intervals, for instance annual intervals, the problem can be solved more easily, although not as accurately. In this paper the so-called many-year component of the capacity of a water reservoir for long term (many-year) regulation is considered which ensures equalisation of the non-uniformity of the annual flow volumes. The problem of the flow changes within a year and

Card 1/2

Regulation over many years of the river flow from the point of view of satisfying power requirements in certain complicated cases. (Cont.)

of the seasonal component of the capacity of the water reservoir is not dealt with. The stochastic relation is considered between the flow rates of neighbouring years but the relation between the flow rates of non-neighbouring years is disregarded. The general theory of regulation of the flow over many years which would permit consideration of any practical case can be worked out on the basis of the "full probability" formula which consists in the following: it is assumed that the co-existence B is related to the random magnitude ξ, F(x) is the distribution function of ξ, i.e. the probability of $\xi > x$. Then P(B/x), probability of materialisation of the co-existence B under the conditions that ξ has assumed the value x and the unconditional probability P(B) of materialisation of the co-existence B are inter-related by the relation $P(B) = \int P\,(B/x)\,dF\,(x)$ where the integral is understood in the sense of the Stiltes integral.

There are 2 figures and 2 Slavic references.

Card 2/2

SUBMITTED: March 18, 1957.

AVAILABLE:

Kartvelishvili, N. A.

AUTHOR: Kartvelishvili, N. A. (Moscow) 24-9-3/33

TITLE: Stability in "small" (on a small scale) of dynamic systems containing small parameters. (Ustoychivost' v malom dinamicheskikh sistem, soderzhashchikh malyye parametry)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.9, pp. 19-26 (USSR)

ABSTRACT: Investigation of the stability of dynamic systems with a large number of degrees of freedom, and particularly of power systems, requires the use of cumbersome characteristic equations which is technically complicated and does not give clear results. Therefore, the question arises whether it is not possible to reduce investigation of the characteristic equations of a given system to investigating several simpler equations. Apart from the case in which certain small (non-diagonal) elements of the characteristic determinant are disregarded, it is possible to reduce it to the derivation of two or several determinants (as is done in the case of autonomous regulation of district heating turbines); such a possibility arises when a part of the differential equations of small oscillations of the system contain low value time constants. Eq.(1), p.19, is the starting equation; this equation has been investigated

Card 1/2

KARTVELISHVILI, N.A.

24-11-19/31

AUTHORS: Yegiazarov, I. V., Kartvelishvili, N. A., Pervozvanskiy, A.A. (Yerevan, Moscow, Leningrad)

TITLE: On the influence of an air filter rubber hose during simulating on models of an hydraulic shock. (K vliyaniyu rezinovogo shlanga s vozdukhom pri modelirovanii gidravlicheskogo udara).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.11, pp.160-166 (USSR)

ABSTRACT: In earlier work published by one of the authors (Refs.1 and 2) the theory was evolved of hydraulic simulation on models of non-steady state movements inside pressure systems. Four similarity criteria were derived for the general case and two criteria for the conditions of hydraulic impact, i.e. for the ordinary case of disregarding the friction and the ratio of the speed of flow to the speed of the shock wave as compared to unity. From the obtained relations and from the condition that all the time constants should be equal in the nature and in the model, it follows that the geometrical scale α_a = 10 to 20, i.e. the speed of the shock wave should be considerably slower in the model than in the natural object. This condition imposes the necessity of simulating

Card 1/3

On the influence of an air filter rubber hose during simulating on models of an hydraulic shock.

an hydraulic impact under conditions of simulating the entire power system, i.e. its hydraulic, mechanical and electrical parts. A decrease in the wave speeds can be effectively obtained by fitting inside the piping an air filled rubber hose. It is proved by theoretical analysis that the difference in the non-steady state processes do not differ materially in such a system from that pertaining in an ordinary piping and that this system does indeed result in a considerable reduction of the wave speeds. The theoretical proof was also confirmed by the experimental results of Z. A. Zoryan obtained in 1955 on a short model (20.5 m long, 640 mm dia) piping, which contained a 160 mm dia. rubber hose, in the Hydraulic Power Systems Laboratory of the Water Power Institute (Vodno-energeticheskiy Institut) (Refs. 2 and 4) and also in experiments in 1956 and 1957 with a longer (67.5 m) piping of an equal diameter and an equal rubber hose diameter. The results of these experiments are reproduced in the graphs, Figs. 2 and 3, p.165, and these show that the hydraulic shock has an equal time characteristic, both in the water of the piping (curves 1)

24-11-19/31

On the influence of an air filter rubber hose during simulating on models of an hydraulic shock.

and in the air of the hose (curves 2) and that the speed of propagation of the shock wave equals 60 m/sec, i.e. it is 15 times smaller than the calculated speed for a piping not containing such a hose. Consequently, the possibility of simulating on models of an elastic hydraulic impact under conditions of simulating an hydraulic power system is proved theoretically as well as experimentally. There are 3 figures and 4 references, all of which are Slavic.

SUBMITTED: June 11, 1957.

AVAILABLE: Library of Congress.

Card 3/3

KARTVELISHVILI, N. A.

AUTHOR: Kartvelishvili, N. A. (Moscow) 24-2-7/28

TITLE: Influence of the inter-relations of the hydraulic, mechanical and electrical processes on the stability of operation of power stations. (Vliyaniye vzaimodeystviya gidravlicheskikh, mekhanicheskikh i elektricheskikh protsessov na ustoychivost' raboty elektrostantsiy).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, No.2, pp. 42-50 (USSR).

ABSTRACT: In this paper the hydraulic systems of hydraulic power stations operating in parallel, the respective turbine equipment, the electrical apparatus and the inter-connecting transmission lines are considered as a single oscillation system. An attempt is made to determine the conditions under which it is permissible to consider separately (as is usually done in practical operation) the stability of steady state hydraulic regimes, the stability of the regulation of the turbines and the convergence to equilibrium of non-steady state electro-mechanical phenomena and also of the conditions under which such practice may lead to erroneous conclusions.
Card 1/4 The derived relations, Eqs.(2.15) and (2.16), p.49, are

24-2-7/28

Influence of the inter-relations of the hydraulic, mechanical and electrical processes on the stability of operation of power stations.

the same as are given in any monograph on the stability of power systems. For usual conditions regarding the relations between the time constants and sufficiently rigid electric couplings, the stability of the steady state regime of a power system is ensured if the following conditions are fulfilled: convergence to equilibrium of non-steady state regimes in the derivation and in the equalisation reservoir in the case of an inertia-free piping and ideal regulation of the turbines; stability of the primary and secondary regulation of turbines operating in parallel in the case of absolutely rigid electric coupling between the individual units, pipe lines with inertia and equalisation reservoirs of infinitely large cross section; convergence to equilibrium of mutual displacement angle pulsations of the rotors of the individual sets in the case of non-regulated turbines (the problem of the "static" electrical stability). The case is also possible where the damping of the rotor displacement angle pulsations is influenced by the hydro-mechanical and even the hydraulic processes including the wave phenomena

Card 2/4

Influence of the inter-relations of the hydraulic, mechanical and electrical processes on the stability of operation of power stations.

in the inflow and the outflow canals (if such canals exist); this is the case of operation of a power station in the neighbourhood of its limit capacity. The conclusion that the electric stability is dependent on the regulation of the prime mover in the case of operation of a power station through a transmission line on a system of infinite power was derived by means of another method (without taking into consideration the equalisation reservoir and secondary regulation) by Andreyeva (Ref.1) and by Kachanova and Krutikova (Ref.2). Andreyeva has shown that it is possible to carry out an independent analysis of the stability of regulation of turbines and convergence of transient processes in hydraulic structures for the case of isolated operation of a hydraulic power station. Krutikova pointed out and proved experimentally that the dependence of the electric stability on the regulation of the prime mover becomes less with widening of the zone of insensitivity of the speed regulator which has not been taken into consideration in this paper. Therefore, for obtaining a full solution of the inter-

24-2-7/28

Influence of the inter-relations of the hydraulic, mechanical and electrical processes on the stability of operation of power stations.

relations between the hydraulic, mechanical and electrical processes, from the point of view of the problem of stability in a small region, it is still necessary to investigate the influence of the insensitivity zone of the speed regulators.
There are 1 figure and 6 references - 5 Russian, 1 French.

SUBMITTED: May 3, 1957.

AVAILABLE: Library of Congress.

Card 4/4

AUTHOR: Kartvelishvili, N. A. (Moscow) SOV/24-58-5-15/31

TITLE: The Analogues to Water Turbines in Power System Analogues (O modelirovanii gidroturbinnykh blokov pri modelirovanii energeticheskikh sistem)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 5, pp 93-96 (USSR)

ABSTRACT: It is shown that the transients in the turbines cannot be neglected near the static power transmission limit; the conditions which must be satisfied in designing any model (apart from the usual ones) given by Eqs.(1) to (3). Only physical models (i.e. not purely electrical or electromechanical ones) are considered. The exact ways in which certain models have been designed, and in which the various inevitable compromises have been made, are detailed. No definite conclusion is reached, other than that it is unsafe to use steady-state parameters for investigating transients.
There are 7 Soviet references.

SUBMITTED: February 21, 1958

Card 1/1

AUTHOR: Kartvelishvili, N. A. (Moscow) SOV/24-58-8-11/37

TITLE: On the Sharpening of Stability Criteria for Established Currents in Fast Flowing Water (Ob utochnenii kriteriya ustoychivosti ustanovivshegosya techeniya na bystrotokakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 8, pp 66-74 (USSR)

ABSTRACT: N. M. Zhavoronkov (Ref 1) experimentally, and V. V. Vedernikov (Ref 2) theoretically have established the occurrence of "superstorminess" (rollwaves) in both turbulent and laminar flow. Vedernikov also made the first theoretical investigation of the stability of a uniform flow by the method of characteristics, starting from the St.Venant equa'ions. Dressler's theoretical study (Ref 3) had shown the absence of continuous periodic solutions of the St.Venant equations for unestablished motion in an open channel. The method of small oscillations was used by Iwasa (Ref 5) who obtained stability criteria for unaereated currents. There are cases in which the criteria of Vedernikov, Iwasa and the author indicate the presence of waves when in fact there

Card 1/3

SOV/24-58-8-11/37

On the Sharpening of Stability Criteria for Established Currents in Fast Flowing Water

are none in the current, and since the criteria are indisputable mathematical consequences of St.Venant's equations, the equations must be made more exact in order to sharpen the criteria. The author begins by considering existing criteria for wave-free currents, and goes on to discuss the equation for a uniform unestablished current. After considering the effect on the stability of the additional terms to the St.Venant equations, the author concludes by discussing the influence of the law of hydraulic resistance on stability. It is found that the additional terms do not correct the criteria in the expected direction but that taking account of differences in the laws of hydraulic resistance for established and unestablished motions corrects the criteria in the desired direction. The author concludes that the problem of stability criteria for wave formation is a question of sharpening the laws of hydraulic resistance in unestablished motion which goes beyond the theory of rapid flows and is a new problem in hydraulics.

Card 2/3

SOV/24-58-8-11/37

On the Sharpening of Stability Criteria for Established Currents in Fast Flowing Water

There are 4 figures and 23 references, 17 of which are Soviet, 2 English, 2 German and 2 French.

SUBMITTED: May 24, 1958

1. Fluid flow--Theory 2. Fluid flow--Mathematical analysis
3. Fluid flow--Stability 4. Fluid flow--Resistance

Card 3/3

AUTHOR: Kartvelishvili, ~~N. A.~~ (Moscow) SOV/24-58-11-17/42

TITLE: Stability of the Steady State Regimes of Hydraulic Power Stations with Equalisation Reservoirs (Ustoychivost' statsionarnykh rezhimov gidroelektrostantsiy s uravnitel'nymi rezervuarami)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 11, pp 75-82 (USSR)

ABSTRACT: The problem of the stability of steady state regimes of hydraulic power stations is to a considerable extent solved. However, information relating to the solution of this problem is scattered in a great variety of sources, mainly articles in periodicals, and these contain in addition to well founded assumptions results which are completely erroneous. Analysis of these errors, which cannot always be easily detected, leads to the conclusion that the source of these errors is the deviation from accurate mathematical formulation. In this paper the main results are reviewed which were obtained by various authors on the stability of steady state regimes of hydraulic power stations with equalisation reservoirs. The subject matter is dealt with under the following paragraph headings:

Card1/2

SOV/24-58-11-17/42

Stability of the Steady State Regimes of Hydraulic Power Stations with Equalisation Reservoirs

influence on the stability of the interaction of hydraulic, mechanical and electrical processes; stability of complicated pressure head systems; non-linear problems; certain problems requiring further investigations. In the last paragraph it is stated that the most important practical problems relating to stability have either been solved already or can be solved without great difficulty by means of well chosen assumptions of the linear theory of oscillations and the method of detecting adequate stability conditions on a large scale on the basis of the Lyapunov theorem as evolved in the most recent work of Lyubimtsev (Refs 14-16). However, there are still two problems which have not been solved: the first is that of the possibility of separate investigation of the hydraulic, mechanical and electrical processes in the non-linear case; the second is the problem of the law of hydraulic resistances. There are 8 figures and 57 references, 21 of which are Soviet, 20 French, 5 Italian, 7 English, 4 German.

SUBMITTED: May 12, 1958

Card 2/2

KARTVELISHVILI, N.A., prof.doktor tekhn.nauk

Long-range streamflow regulation in case of parallelly working hydroelectric power stations. Izv.VNIIG 61:181-190 '58. (MIRA 13:6)

(Hydroelectric power stations)

SOV/24-59-1-1/35

AUTHOR: Kartvelishvili, N.A., (Moscow)

TITLE: The Performance of a Power System and Theory of Probability (Rezhimy energeticheskikh sistem i teoriya veroyatnostey)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, Energetika i Avtomatika, 1959, Nr 1, pp 3-10 (USSR)

ABSTRACT: Two kinds of factors can affect the performance of a power system which provides the load for the diurnal and annual variations. This performance can be established at the planning stage or it cannot be pre-determined at all due to the changeable factors such as rate of river flow (discharge) (Ref 1). In the latter case positive results can be obtained when the problem is considered by means of statistical probability. Thus, if there are n hydro-electric power stations in the system and Q^*_{ik} is the natural power consumption (i.e. when no water cisterns are employed) of the k-th station at a time t_i, then the probability distribution function (1) can be defined for any m = 1,2... and $t_1 \dots t_m$. The seasonal variations of the river flow can be determined when the constant values $\tau_1 \dots \tau_{m-1}$ and

Card 1/4

The Performance of a Power System and Theory of Probability

Q_{ik} are so adjusted that $t_1 = t$, $t_2 = t + \tau_1, \ldots,$ $t_m = t + \tau_{m-1}$. Then the functions F_m (but not the consumption) will become the periodic functions t with the period equal to 1 year. Also the functions (1) could be unconditional or conditional (when hydro-forecasting is applied) functions of distribution of probabilities. The figure on p 4 gives the example of an unconditional function (curve AB) for the volume V of a high water flow at any section of a river. The volume V can be affected, for example, by thawing snow N, which is represented by the curve CD lying between the curves AB and OFHK (dotted line), both representing the extreme cases. The determination of the river flow (discharge) by means of the functions (1) can be facilitated when the flow is considered as a Markov process (2) with discrete time where the total time is divided into equal intervals Δt, for which the mean consumption Q^{*}_{ik} is found (k - position number of plant, i + ℓ - interval position, ℓ - digit). Similar to the functions (1) the function (2) is also a periodic function ℓ of the period h (h - number of intervals Δt). As the maximum period is equal to one year, it is possible to find the probability distribution function of the annual volume of the river flow ξ with a consideration of the first 3 moments $\bar{\xi}$, ξ^2 and ξ^3. In general, the function $f_i = f_i(\xi_i)$ can be defined from the expression:

$$F_i(\xi_i) = \frac{1}{2} + G(f_i)$$

where G - integral of probability. It is assumed that the n-dimensional distribution of a random vector $(f_1, \dots, f_n)$ is normal which, in the case of the probability distribution function of the vector $(\xi_1, \dots, \xi_n)$ can be shown as the formula for $F(x_1, \dots, x_n)$ on p 7, where Δ_{ik} - algebraic complement of the element r_{ik} of the determinant of the matrix $\|r_{ik}\|$. The statistical method of planning and designing the operation of the power system as described above is much superior to the calendar method (Ref 5 and 6). This method, however,

SOV/24-59-1-1/35

The performance of a Power System and Theory of Probability

should be more elaborated so that it can be adjusted for practical requirements. There is 1 figure and 7 Soviet references.

SUBMITTED: 15th September 1958

Card 4/4

KARTVELISHVILI, N.A.

Reply to the comments of V.A. Venikov and A.V. Ivanov-Smolenskii on the article "Simulation of hydraulic turbine units during the simulation of power systems." Izv. AN SSSR. Otd.tekh.nauk. Energ. i avtom. no.1:136 '59. (MIRA 12:7)
(Hydraulic models) (Venikov, V.A.) (Ivanov-Smolenskii, A.V.)

KARTVELISHVILI, N.A. (Moskva)

Basis for determining the maximum capacity of hydraulic installations on rivers. Izv.AN SSSR.Otd.tekh.nauk.Energ. i avtom. no.3:135-140 My-Je '59. (MIRA 12:8)
(Hydraulic engineering)

14(6) SOV/98-59-5-6/21

AUTHOR: Kartvelishvili, N.A., Professor, and Doctor of Technical Sciences

TITLE: Some Problems Pertaining to the Design of Power Generating Units in Hydroelectric Power Plants

PERIODICAL: Gidrotekhnicheskoye stroitel'stvo, 1959, Nr 5, pp 24-29 (USSR)

ABSTRACT: The article is concerned with the effect of the reciprocal action of electric, mechanic, and hydraulic processes upon the operating stability of hydroelectric power plants. Especially, hydraulic processes and irregularities are subject to extensive discussion. The maximum permissible irregularity with regard to performance of a power generating unit can be expressed by the following formula: $\frac{\Delta n_m}{n_o} = 0,75 \frac{n_p}{n_o} - 1$,

where $n_m / n_p = 130/170 \approx 0.75$,

Card 1/2

SOV/98-59-5-6/21

Some Problems Pertaining to the Design of Power Generating Units in Hydroelectric Power Plants

while n_o is the synchronous number of revolutions, n_m is the maximum, and n_p - the runaway number of revolutions. Furthermore, the Rybinsk GES and Armenenergo are cited in connection with the increase of the number of revolutions. In conclusion, balancer reservoirs are discussed, whose task is protection of diversion canals from hydraulic shocks. Also mentioned in this connection is the name of M.A. Mostkov, author of a treatise on hydraulic power. There is 1 graph and 5 references, 1 of which is French and 4 Soviet.

Card 2/2

KARTVELISHVILI, N.A. (Moskva)

Effect of errors in the characteristics of relative increments on the optimum load distribution of electric power plants. Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtom. no.6:16-21 N-D '59. (MIRA 13:8)

(Electric power plants--Load)

KARTVELISHVILI, N. A. (Moscow)

"Waves Motion in Open Channels for Periodical Changes of the Mass Flow."

"The Basic Hydraulic Relations Resulting From the Differential Equations of Hydrodynamics."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

KARTVELISHVILI, N.A. (Moskva)

Methods of technical and economic analysis in power engineering.
Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtomat. no.1:27-32
Ja-F '60. (MIRA 13:2)
(Power engineering)

~~66956~~ 69636

S/024/60/000/02/003/031
E194/E155

28.2000
28.1000

AUTHOR: Kartvelishvili, N.A. (Moscow)

TITLE: Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1960, Nr 2, pp 13-19 (USSR)

ABSTRACT: Transient processes in power systems are typical oscillatory processes to which all the methods of the general theory of oscillations, and in particular the general theory of stability, may be applied. A special feature of power systems is that they have a large number of degrees of freedom and so require systems of differential equations of a very high order to describe their transient processes. It is accordingly necessary to simplify the systems of equations of transient processes without distorting the results. Fundamentally, the simplification consists in reducing the order of the system by neglecting so-called small time-constants and by replacing the generating sets in each individual station or even in several neighbouring stations by a single equivalent machine, which also involves neglecting

Card 1/7

~~66026~~ L9636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

several time-constants. Such simplifications can lead to difficulties and completely incorrect results. For instance, in studying the stability of hydraulic pressure systems in hydro-electric stations the degrees of freedom of the generating sets are usually neglected in favour of the so-called hypothesis of ideal turbine control. This simplification gives correct results only if the time-constant of the turbine pipe-lines is also neglected, i.e. neglecting water-hammer. If this is not done, the erroneous conclusion is reached that the system is fundamentally unstable. Finally, the number of degrees of freedom will increase as power systems develop and are united into a single unified power system of the USSR; this may lead to qualitative changes in the nature of the transient processes. For example, in a unified power system the propagation of disturbances from one end of the system to the other should somewhat resemble wave effects. Analysis of such effects becomes impossible if a complicated system is to be reduced to a simple one with

Card 2/7

~~66056~~ 69636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

a small number of stations. Expression (2.1) is the general equation of motion of an oscillatory system with concentrated constants depending on a small parameter. The problem of simplifying this system of equations is considered. It is noted that on replacing several sets in a station by a single equivalent machine we neglect rapid oscillations of these sets relative to one another, in comparison with the slower oscillations of them all relative to sets in other stations. It is seen that mathematically this is equivalent to neglecting certain time constants. The expressions (2.6) and (2.7) give a family of positions of equilibrium for rapid oscillations. The equilibrium positions are stable if all the roots of Eq (2.8) are always real and negative when Eqs (2.6) and (2.7) are satisfied. The requirement that small parameters must be negligible is not always fulfilled but in making calculations of transient processes in power systems it is tacitly assumed to be fulfilled. Oscillation problems are often solved by first proving

Card 3/7

~~66036~~ 69636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

that stability exists under rapid changes, and then dealing with the case of slow changes. A method is described that was used to investigate the static stability of two hydro-electric stations operating in parallel. Conditions were determined under which it is necessary to solve the general problem of stability, allowing for turbine governing and other transient conditions, as well as determining the conditions for which it is permissible to sub-divide the general problem into three independent problems of stability. Other methods typical of the analysis of linear systems may be used in finding equivalents for sets or stations. One method is the investigation of transmission functions using various devices of matrix calculus. Here again, the physical essence of the work consists in separating the rapid motion of the generators relative to one another within a given station from the slow motion of groups of generators relative to other groups. In most cases, this separation of rapid and slow motion greatly

Card 4/7

69636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

reduces the order of the systems of differential equations to be investigated, but even the simplified systems are still very complicated. It is accordingly important to develop procedures for simplifying the initial systems and for analysing the simplified systems. The problem should be solved by means of digital computers or machine-analogues: physical modelling is inapplicable. The procedure for applying computers to these complicated cases still requires development. It will of course entail more than mere mechanical repetition of the operations which were manually fulfilled for simpler cases and should exploit the fundamentally new possibilities of computers. In power systems the transient process with definite initial conditions is usually of less interest than the region of permissible initial deviation within which the system returns to the steady state. This region may of course be found by determining the motion for various initial conditions, but it is much simpler to use Lyapunov's so-called direct

Card 5/7

~~66036~~ 69636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

method. Several ways of doing this have been published but the present article proposes a new method of dealing with the problem. Consider the stability in a major condition of equilibrium, described by Eqs (3.1), which may be considered as simplified equations of slow displacement (see Eqs (2.5) and (2.7)) from which certain variables have been excluded. The corresponding first-order equation is given by expression (3.2). The determination of the coefficients in this equation is then explained. If the minor stability conditions are fulfilled, then the reversibility of Lyapunov's theorem about the stability of linear systems indicates that the quadratic form used in determining the equation coefficients will be positive. Its differential with respect to time is given by Eq (3.7), which is definitely negative near the origin of coordinates, and within the surface represented by expression (3.8). It is shown that a certain ellipsoid, which is tangential to the surface of expression (3.8) but nowhere intersects it, falls entirely within the region of major stability.

Card 6/7

~~66036~~ 69636

S/024/60/000/02/003/031
E194/E155

Transient Processes in Power Systems as a Problem of the General Theory of Oscillations

The coordinates of the point of contact, and so of the boundary of stability, are given by Eqs (3.11) and (3.3). The ellipsoid of stability may then simply be determined. This method of constructing the limiting conditions for stability is not unique and other methods of solving the problem are known. They differ from one another mainly in the construction of the Lyapunov function. This construction is often based on various specific properties of the oscillatory system considered, but for power systems such devices are inapplicable because of their specific features. The method of Ayzerman is the most general in this case. The advantage of the method proposed in the present article is that although it is more difficult to calculate it usually gives a wider region of stability than does the Ayzerman method. There are 18 Soviet references.

Card 7/7

SUBMITTED: December 8, 1959

KARTVELISHVILI, N.A. (Moskva)

Economic operating regimes of electric power systems. Izv.AN SSSR. Otd.tekh.nauk.Energ.i avtom. no.3:11-20 My-Je '60. (MIRA 13:7)
(Electric power plants)
(Electric power distribution)

KARTVELISHVILI, N.A., doktor tekhn.nauk, prof.

Variations in the daily regulated tailwater level close to a hydro-electric power station. Gidr. stroi. 30 no.11:45-47 N '60. (MIRA 13:10)

(Hydraulic engineering)

KAMKINA, T.A.; inzh.; KARTVELISHVILI, N.A.; doktor tekhn.nauk, prof.

Determination of the main parameters of hydroelectric power stations with long term regulation. Izv. vys. ucheb. zav.; energ. 3 no.11:94-99 N '60. (MIRA 13:12)

1. Moskovskiy ordena Lenina energeticheskiy institut. Predstavlena kafedroy gidroenergetiki.
(Hydroelectric power stations)

KARTVELISHVILI, N. A., LYUBIMTSEV, YA. K., ARONOVICH, V. V. and BELYUSTINA, L. N.

"Application of oscillatory system analysis to stability problems in the steady-state operation of hydroelectric stations and power system."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR, 9-19 Sep 61

Research Institute of Technical Physics, Gorky State University, Gorky

KARTVELISHVILI, N.A. (Moskva)

Concerning the optimum distribution of active loads and voltage conditions in electric power systems. Izv.AN SSSR.Otd tekh.nauk. Energ.i avtom. no.2:3-6 Mr-Ap '61. (MIRA 14:4)

(Electric power distribution)

ARONOVICH, G.V.; BELYUSTINA, L.N.; KARTVELISHVILI, N.A.; LYUBIMTSEV, Ya.K.

Problems of the stability of stationary operating conditions of hydroelectric generating stations and power systems viewed as problems of the theory of oscillations. PMTF no.3:56-73 S-O '61. (MIRA 14:8)

(Hydroelectric power stations) (Oscillations)

KARTVELISHVILI, N.A. (Moskva)

Present state of the hydraulic theory of nonstationary flows according to research in the U.S.S.R. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i [illegible] mashinostr[illegible]07-216 My-Je '61. (MIRA 14:6)
(Hydrodynamics)

GORNSHTEYN, V.M. (Moskva); GORTINSKIY, S.M. (Moskva); KARTVELISHVILI, N.A. (Moskva); MAMIKONYANTS, L.G. (Moskva); MEL'NIKOV, N.A. (Moskva); TIMOFEYEV, D.V. (Moskva); TSVETKOV, Ye.V. (Moskva)

Principal trends in carrying out overall electrification. Elektrichestvo no.10:77-79 O '61. (MIRA 14:10)
(Electrification)

KARTVELISHVILI, N.A. (Moskva)

General features of the problem concerning the optimization of the performance of electric power systems. Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtom. no.1:45-53 Ja-F '62. (MIRA 15:3)

(Interconnected electric utility systems)

ARKHANGEL'SKIY, V.A.; KARTVELISHVILI, N.A.; MIKHAYLOV, G.K.

On E.P.Kovalenko's investigations on the "Unsteady flow of water in open beds." Izv.AN SSSR.Otd.tekh.nauk.Mekh. i mashinostr. no.4:183-184 Jl-Ag '62. (MIRA 15:8)
(Hydrodynamics) (Kovalenko, E.P.)

ARKHANGEL'SKIY, V.A.; KARTVELISHVILI, N.A.; MIKHAYLOV, G.K.

Apropos of E.P.Kovalenko's study on the unsteady motion of water in open channels. Inzh.-fiz.zhur. 5 no.8:130-132 Ag '62. (MIRA 15:11)

1. Institut mekhaniki AN SSSR, Moskva.
(Hydrodynamics)

Transactions of the 6th Conf. on Probability Theory and Mathematical Statistics and of the Symposium on Distributions in Infinite-Dimensional Spaces held in Vil'nyus, 5-10 Sep '60. Vil'nyus Gospolitizdat Lit SSR, 1962. 493 p. 2500 copies printed

KARTVELISHVILI, N.A. (Moskva)

Transition conditions and stability of autonomous dynamic systems with a high final number of the degrees of freedom. Izv.AN SSSR. Mekh. i mashinostr. no.4:42-53 Jl-Ag '63. (MIRA 17:4)

KARTVELISHVILI, N.A. (Moskva)

Calculating pressure structures of hydroelectric power plants for load increase and stability of hydraulic conditions. Izv. AN SSSR. Mekh. i mashinostr. no.6:74-79 N-D '63. (MIRA 17:1)

AVTONOMOV, G.Ye.; KARTVELISHVILI, N.A.; CHERNYATIN, I.A.

Results of the calculations of a water hammer by the effective curves of the shutting-off of turbine deflectors. Izv.AN SSSR.Mekh. i mashinostr. no.5:155-159 S-O '63. (MIRA 16:12)

ARONOVICH, G.V. (Gor'ky); KARTVELISHVILI, N.A. (Moscow)

"Application of the stability theory to the problems of statical and dynamical stability of power systems"

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 January - 5 February 1964

KARTVELISHVILI, N.A. (Moskva)

Equations describing the optimum seasonal operating conditions of a power system as a probability process with a continuous time factor. PMTF no.1:59-67 Ja-F '64. (MIRA 17:4)

KARTVELISHVILI, N.A. (Moskva)

Errors in determining the probability of the disturbance of stability of some dynamic systems. Izv. AN SSSR. Mekh. i mashinostr. no. 2:186-187 Mr-Ap '64. (MIRA 17:5)

KARTVELISHVILI, N. A. (Moskva)

Continual models and stability in the small of dynamic systems consisting of a multitude of similar elements. Izv. AN SSSR. Mekh. i mashinostr. no.3:51-60 My-Je '64. (MIRA 17:7)

ARONOVICH, G.V.; KARTVELISHVILI, N.A.

Applying the theory of stability to the problems of static and dynamic stability of power systems. Izv. AN SSSR Mekh. i mashinostr. no.5:131-136 S-O '64 (MIRA 18:1)

KARTVELISHVILI, N.A., doktor tekhn. nauk

Inertial pressure in the Bernoulli equation and the elastic hydraulic impact. Izv. VNIIG 76:137-146 '64. (MIRA 18:1C)

KARTVELISHVILI, N.A.

About V.A. Venikov and I.V. Litkens' letter. Izv. AN SSSR. Mekh. no.6:157 N-D '65. (MIRA 18:12)

CA KARTVELISHVILI, M. S.

///

Changes of reactivity of the organism under conditions of a mountain climate V. S. Asatiani, M. S. Kartvelishvili, O. V. Kekelidze, and T. P. Pichkhaya (Tuberc. Inst., Tbilisi). *Soobshcheniya Akad. Nauk Gruzinskoi S.S.R.* 10, No. 2, 91-7(1949).--Arrival at an elevated location (1300 m.) causes a gradual rise of carbonic anhydrase and erythrocyte count which continues for about 1 month (increase of about 50%) after which the high level remains constant. Muscular work under these conditions leads to a moderate rise of carbonic anhydrase, which is not the case at low elevations. The results can be caused by higher solar irradiation coupled with lower atm. pressure. Inhalation of pure O does not increase the carbonic anhydrase level, contrary to observations made by Strel'tsov, *et al.*, (*Byull. Eksptl. Biol. Med.*, No. 1(1947)). Rabbits fed thiouracil for 3 weeks on being exposed to high level of solar radiation and low pressure (chamber expt.) do not display an increase of carbonic anhydrase activity. Human subjects at elevated locations display signs of some thyroid hypofunction owing apparently to a regulatory action, which is also displayed by a steady rise of blood cholesterol during the 1st month of residence and an irregular rise of vitamin A in the blood.

G. M. Kosolapoff

KARTVELISHVILI, N.A.

Some probability characteristics of a river flow. Izv.AN Arm. SSR.Ser.tekh.nauk 16 no.2/3:83-94 '63. (MIRA 16:9)
(Rivers)

KARTVELISHVILI, TS YE

GVANTSELADZE, V.S.; CHOCHUA, N.Sh.; KARTVELISHVILI, TS.Ye.

Hypertension in children and adolescents [with summary in English]. Pediatriia 36 no.3:17-21 Mr '58. (MIRA 11:3)

1. Iz detskogo otdeleniya Instituta klinicheskoy i eksperimental'noy kardiologii AN Gruzinskoy SSR (dir.-akad. M.D.TSinamzgvarishvili [deceased])

(HYPERTENSION)

GVISHIANI, G.S.; KARTVELISHVILI, TS. Ye.

Experimental hypertonia treatment with the new preparation hexolina. Soob. AN Gruz. SSR 40 no.1:203-210 O '65.
(MIRA 18:12)

KARTVELISHVILI, Yu. L.

"Investigation of the Operation of Train Electromotors in Diesel Locomotives in an Operation With Weakened Field." Official opponents were: Doctor of Technical Sciences Professor Ye. V. Nitusov and Docotor of Technical Sciences A. S. Dimitradze.

Dissertation for the Degree of a Candidate of Technical Science ~~1946-1959.~~ At the All-Union Scientific Research Institute of Railroad Traffic Engineers.

January 14, 1952

KARTVELISHVILI, Yu.L., kandidat tekhnicheskikh nauk (g.Rostov-na-Donu)

Rotary snowplow operated in combination with Diesel locomotives. Zhel.dor.transp.37 no.11:22-24 N '55. (MIRA 9:2)
(Railroads--Snowplows)

KARTVELISHVILI, Yu.L., kand. tekhn. nauk, dots.

New rotary snowplow for use with diesel-electric locomotives (from "Railway Locomotives and Cars," 129 No.r 1955). Elektrichestvo no.12: 84-85 D '56. (MIRA 11:3)

(Railroads--Snow protection and removal)

Kartvelishvili, Yu. L.

KARTVELISHVILI, Yu.L., kand.tekhn.nauk; PORTNOY, M.Kh., inzh. (Rostov-na-Donu)

Ball screws for electric ballast layers. Put' i put.khoz. no.12:16 D '57. (MIRA 10:12)

(Ballast (Railroads))

KARTVELISHVILI, Yu.L., kand.tekhn.nauk, dots.

Modernizing the electric drive of the SE-3 excavator. Trudy RIIZHT no.26:77-83 '58. (MIRA 12:3)
(Excavating machinery) (Electric driving)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000720920010-0"

KARTVELISHVILI, Yu.L., kand.tekhn.nauk

Dynamic analysis of the mouldboards of all-purpose bulldozers. Stroi. i dor. mashinostr. 5 no.8:18-21 Ag '60. (MIRA 13:8)
(Bulldozers)

KARTVELISHVILI, Yu.L., kand.tekhn.nauk, dotsent

Determining the contact stress resulting from the collision of a dragline-excavator bucket with an obstacle. Izv.vys.ucheb.zav.; mashinostr. no.2:108-118 '62. (MIRA 15:5)

1. Gruzinskiy politekhnicheskiy institut im. V.I.Lenina.
(Excavating machinery)

KARTVELISHVILI, Yu.L., kand. tekhn. nauk, dotsent

Determination of dynamic loads in ropes of the "pulley-winch" system. Izv. vys. ucheb. zav.; mashinostr. no.2: 135-143 '63. (MIRA 16:8)

1. Gruzinskiy politekhnicheskiy institut.

KARTVELISHVILI, Yu.L., kand.tekhn.nauk, dotsent

Calculating the bucket chain of an excavator for impact loads. Izv. vys.ucheb.zav.; mashinostr. no.7:150-160 '64. (MIRA 17:10)

1. Gruzinskiy politekhnicheskiy institut.

KARTVELISHVILI, Yu.L., kand. tekhn. nauk; PANKRASHKIN, P.V., kand. tekhn. nauk; KURILO, G.M., inzh.; KHRAMOV, I.N., inzh.

Determining impact loads acting on the dragline bucket. Stroi. i dor. mash. 10 no.4:16-17 Ap '65. (MIRA 18:5)

KARTVELISHVILI, Yuriy Lavrent'yevich; GUDADZE, Georgiy Iosifovich; KIKNADZE, Nodar Aleksandrovich; KIPIANI, Tornike Terent'yevich; SUTIDZE, Liana Nikolayevna; BEZHANOV, Tigran Vladimirovich

[Principles of designing machinery for earthwork] [Osnovy proektirovaniia mashin dlia zemlianykh rabot. Tbilisi, Gos.izd-vo "TSodna"] 1964. 236 p. [In Georgian] (MIRA 17:4)

ACC NR: AP7000435 (A) SOURCE CODE: UR/0251/66/044/002/0373/0377

AUTHOR: Tavadze, F. N. (Academician AN GruzSSR); Kartvelishvili, Yu. M.

ORG: Georgian Institute of Metallurgy (Gruzinskiy institut metallurgii)

TITLE: Obtaining compact chloride-process chromium and investigating its physico-mechanical properties

SOURCE: AN GruzSSR. Soobshcheniya, v. 44, no. 2, 1966, 373-377

TOPIC TAGS: chromium, induction melting, brittleness, hardness, powder metal

ABSTRACT: This work is a continuation of a previous investigation (N. V. Ageyev, F. N. Tabadze, Yu. M. Kartvelishvili. Polucheniye khloridnogo khroma. Poroshkovaya metallurgiya, no. 2, 1963, 88), with the difference that it deals with the physico-mechanical properties of ingots (measuring 60 mm in length and 6 mm in diameter) obtained from pressed and degassed pellets of chloride-process chromium measuring 15 mm in diameter that had been remelted by the crucibleless induction heating method. (By utilizing the forces of surface tension the molten metal can be maintained in suspended state in the electromagnetic field of the inductor. By reducing the power supplied to the inductor, the field can be weakened so that the molten metal

ACC NR: AP7000435

descends into the molds resting on a turntable one of whose quadrants is within the melting chamber.) Since the normal impact and tensile tests are too rigorous with respect to chromium, the ingots were subjected to tests in milder stressed states, namely, tests of uniaxial static compression of cylindrical specimens: this method assures a sufficiently reliable assessment of the plastic properties of Cr and can be used to determine the effect of temperature, deformation rate and degree of purity on the plasticity of the metal, as well as to determine the temperature of the transition of Cr from brittle to plastic state (temperature of the threshold of cold brittleness). The hardness of the ingots of chloride-process averaged 105 kg/mm^2 and its corresponding cold brittleness threshold was close to 170°C, as also indicated by the findings on plasticity, considering that the lower the plasticity of Cr at room temperature, the lower its cold-brittleness threshold temperature is. A comparison of the hardness, compressive strength (plasticity) and cold brittleness thresholds of the chromium produced by the chloride-process, aluminothermic and electrolytic methods (see table(shows that the chromium produced by the chloride-process method is distinctly superior in its physico-mechanical properties to the chromium produced by the aluminothermic and electrolytic methods.

Card 2/3

ACC NR: AP7000435

Properties of metals	Aluminothermic chromium	Electrolytic chromium	Chloride-process chromium
% of gaseous impurities (O_2, N_2, H_2)	0,281 ÷ 0,462	0,026 ÷ 0,071	0,035
% of other impurities	0,258 ÷ 2,055	0,169 ÷ 0,441	0,005
Total purity, %	98	99,6	99,96
Hardness, kg/mm^2	187	121	105
Compressive strain, %	17,0 ± 2,0	25	32 ÷ 33
Cold-brittleness threshold, °C	400	280	170

Orig. art. has: 2 figures, 1 table.

SUB CODE: 13, 11, 20/ SUBM DATE: 07Apr66/ ORIG REF: 002/ OTH REF: 002

Card 3/3

67900

5.2100
~~5(1), 18(6)~~

S/020/60/130/06/032/059
B011/B015

AUTHORS: Ageyev, N. V., Corresponding Member AS USSR, Tavadze, F. N., Kartvelishvili, Yu. M.

TITLE: On the Production of Pure Chromium Chlorides 21

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 6, pp 1294 - 1297 (USSR)

ABSTRACT: To obtain chromium in the highest possible degree of purity the authors recommend the production of pure chromium chlorides from electrolytic chromium by chloride distillation in a chlorine current, and subsequent reduction with alkali metals or alkaline-earth metals. In this paper they deal with the production of pure chromium chlorides. The following reactions are possible between metallic chromium and chlorine: $2Cr + 3Cl_2 \rightarrow 2CrCl_3$ (1); $Cr + Cl_2 \rightarrow CrCl_2$ (2); $2CrCl_3 + Cr \rightarrow 3CrCl_2$ (3). The authors calculated the free energies and equilibrium constants of these reactions from standard data. The results (temperature dependence of the free energies and constants) are graphically shown on figures 1 and 2. The thermodynamic determination shows that in the temperature range

Card 1/3

67900

On the Production of Pure Chromium Chlorides

S/020/60/130/06/032/059
B011/B015

investigated reaction (1) is most likely to occur whereas reaction (3) is most unlikely. Metallic chromium was supplied by the Institut prikladnoy khimii i elektrokhimii AN GruzSSR (Institute of Applied Chemistry and Electrochemistry of the Academy of Sciences of the Gruzinskaya SSR). Figure 3 shows the apparatus for the production of pure chromium chlorides. The procedure may be divided into three sections: (a) degasification of chromium; (b) chlorination of chromium; (c) purification of the chlorides produced by sublimation. These three stages are discussed in detail. Degasification at 400-450° in a vacuum of 10^{-4}mm during 1.0-1.5 h was sufficient to eliminate the entire hydrogen. Chlorination is effective at 595-605°. The chlorination time is to a considerable extent determined by the rate of chlorine addition and the amount of weighed chromium portion. Chlorination took about 50 minutes at a chromium quantity of 20-30 g. At a slow chlorine passage $CrCl_2$ is produced. It is necessary to purify the chromium chlorides under the exclusion of air and steam in vacuum or in pure chlorine because the chromium trichloride vapors oxidize easily in the air. $CrCl_3$ dissociates above 1300°, signs of dissociation are, however,

Card 2/3

S/226/63/000/002/012/014
A006/A101

AUTHORS: Ageyev, N. V., Tavadze, F. N., Kartvelishvili, Yu. M.

TITLE: Preparation of chromium chloride

PERIODICAL: Poroshkovaya metallurgiya, no. 2, 1963, 88 - 95

TEXT: A method of preparing chromium chloride is proposed which yields metal with a low content of gaseous and metallic impurities. The method consists in chlorinating ore, chrome oxide, or chrome metal with subsequent purification of the product by distillation in a chlorine current, and reduction with magnesium. Chlorination of Cr oxide was conducted at 950 - 1,000°C for 1 hour, and chlorination of electrolytic Cr at 595 - 605°C for 50 min. The reactor capacitor was coated with asbestos at the spot where Cr chlorides were deposited; this made it possible to maintain a temperature in the capacitor (500 - 600°C) exceeding the melting point of volatile chlorides but not attaining the melting point of Cr chloride. In such a manner only pure Cr chloride was deposited in the capacitor. The Cr-chlorides obtained were purified at 900 - 950°C by distillation in purified chlorine current. A spectral analysis of Cr chlorides

Card 1/2

obtained from Cr oxide and electrolytic Cr shows that high-purity chlorides can thus be obtained. The magnesium-thermal reduction of Cr chloride was performed in purified helium. Efficient reduction takes place at 650°C when magnesium is melted, and shows an explosive nature. The reactor was held at this temperature for 15 min; the temperature was then elevated to 850°C. Magnesium chloride and magnesium was eliminated from the crucible by melting and distillation in a vacuum during 80 min. Almost 100% Cr was extracted from the chloride in the form of gray powder containing not less than 99.96% Cr. The interaction between Cr chloride and magnesium during the reduction process was studied and is explained. There are 5 figures.

ASSOCIATION: Institut metallurgii AN GSSR i Institut metallurgii im. A. A. Baykov AN SSSR (Institute of Metallurgy, AS GSSR, and Institute of Metallurgy imeni A. A. Baykov, AS USSR)

SUBMITTED: April 14, 1962

KARTYSHEV, A.A.

RYKHTER, E.V. (Molotov); ZAGULYAYEV, M.A. (Molotov); KARTYSHEV, A.A. (Molotov).

Physical and chemical properties of the dust of metallic magnesium alloys in connection with the solution of ventilation problems. Vod. i san. tekh. no.3:25-27 Mr '57. (MLRA 10:6)
(Dust--Removal) (Magnesium alloys)

KARTYSHEV, B.N.

Grinding with vibrating abrasives. Mashinostroitel' no.4:33 Ap '63. (MIRA 16:5)

(Grinding and polishing)